



Decomposing the association of completed suicide with air pollution, weather, and unemployment data at different time scales

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Abstract:

BACKGROUND: Research has implicated environmental risk factors, such as meteorological variables, in suicide. However, studies have not investigated air pollution, known to induce acute medical conditions and increase mortality, in suicide. This study comprehensively assesses the temporal relationship between suicide and air pollution, weather, and unemployment variables in Taipei City from January 1 1991 to December 31 2008. **METHODS:** This research used the empirical mode decomposition (EMD) method to de-trend the suicide data into a set of intrinsic oscillations, called intrinsic mode functions (IMFs). Multiple linear regression analysis with forward stepwise method was used to identify significant predictors of suicide from a pool of air pollution, weather, and unemployment data, and to quantify the temporal association between decomposed suicide IMFs with these predictors at different time scales. **RESULTS:** Findings of this study predicted a classic seasonal pattern of increased suicide occurring in early summer by increased air particulates and decreased barometric pressure, in which the latter was in accordance with increased temperature during the corresponding time. Gaseous air pollutants, such as sulfur dioxide and ozone, were found to increase the risk of suicide at longer time scales. Decreased sunshine duration and sunspot activity predicted the increased suicide. After controlling for the unemployment factor, environmental risks predicted 33.7% of variance in the suicide data. **CONCLUSIONS:** Using EMD analysis, this study found time-scale dependent associations between suicide and air pollution, weather and unemployment data. Contributing environmental risks may vary in different geographic regions and in different populations.

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Resource Description

Exposure : ☒

weather or climate related pathway by which climate change affects health

Air Pollution, Temperature

Air Pollution: Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): NOx; CO

Temperature: Fluctuations

Geographic Feature: ☒

resource focuses on specific type of geography

Climate Change and Human Health Literature Portal

Ocean/Coastal, Urban, Other Geographical Feature

Other Geographical Feature : subtropical

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Country

Other Asian Country: Taiwan

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Injury, Mental Health/Stress

Mental Health Effect/Stress: Other Mental Disorder

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☒

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Population of Concern: ☒

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Medium-Term (10-50 years)

Vulnerability/Impact Assessment: ☒

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content

